FIG. 1

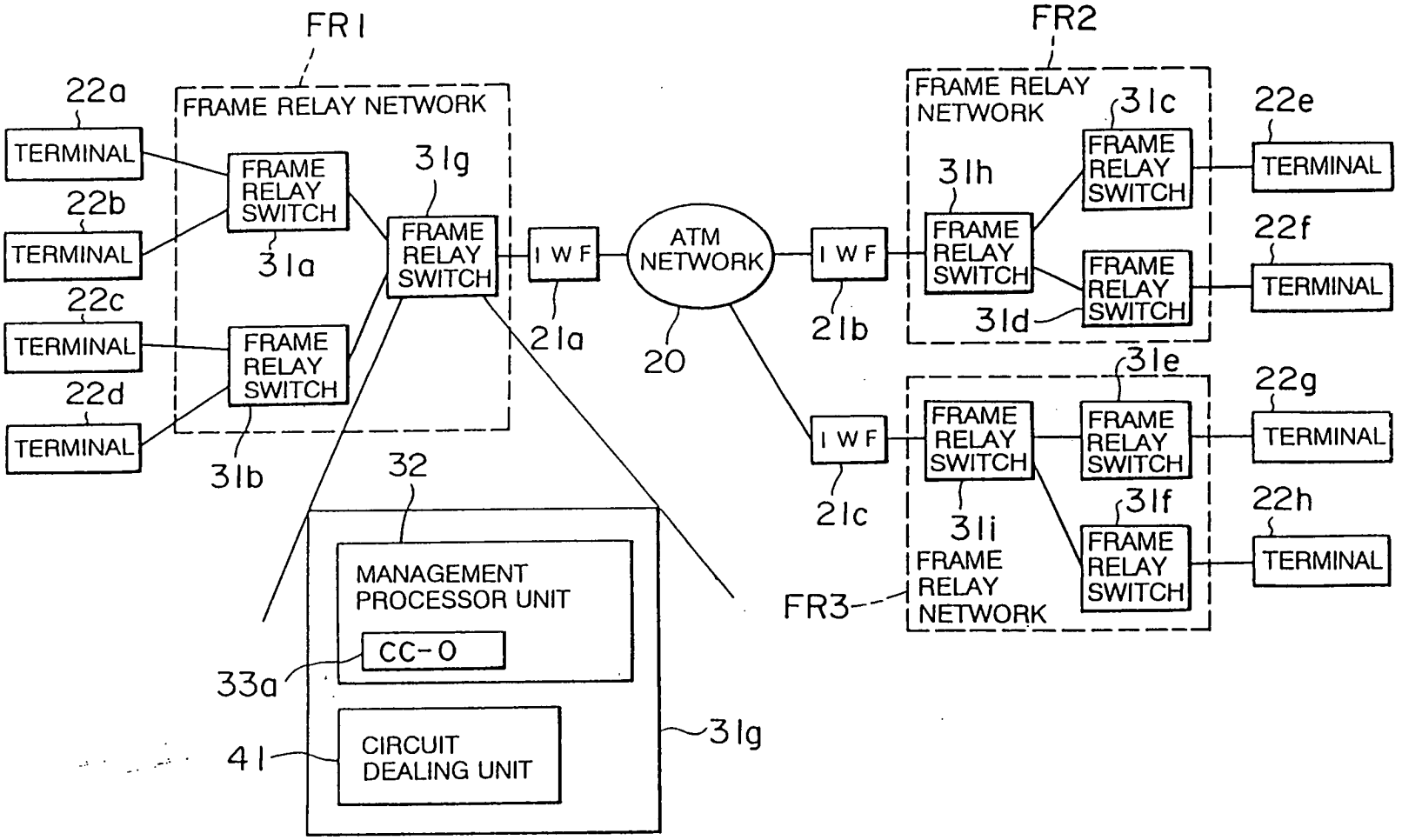

FR1
FRAME RELAY NETWORK
22a
TERMINAL
22b
TERMINAL
22c
TERMINAL
22d
TERMINAL
FRAME RELAY SWITCH
31a
31b
31g
FRAME RELAY SWITCH
I W F
21a
ATM NETWORK
20
I W F
21b
I W F
21c
FR2
FRAME RELAY NETWORK
31h
FRAME RELAY SWITCH
31c
FRAME RELAY SWITCH
31d
FRAME RELAY SWITCH
22e
TERMINAL
22f
TERMINAL
31e
FRAME RELAY SWITCH
FRAME RELAY SWITCH
22g
TERMINAL
31i
FRAME RELAY NETWORK
FR3
31f
FRAME RELAY SWITCH
22h
TERMINAL
32
MANAGEMENT PROCESSOR UNIT
CC-0
33a
CIRCUIT DEALING UNIT
41
31g

FIG. 2

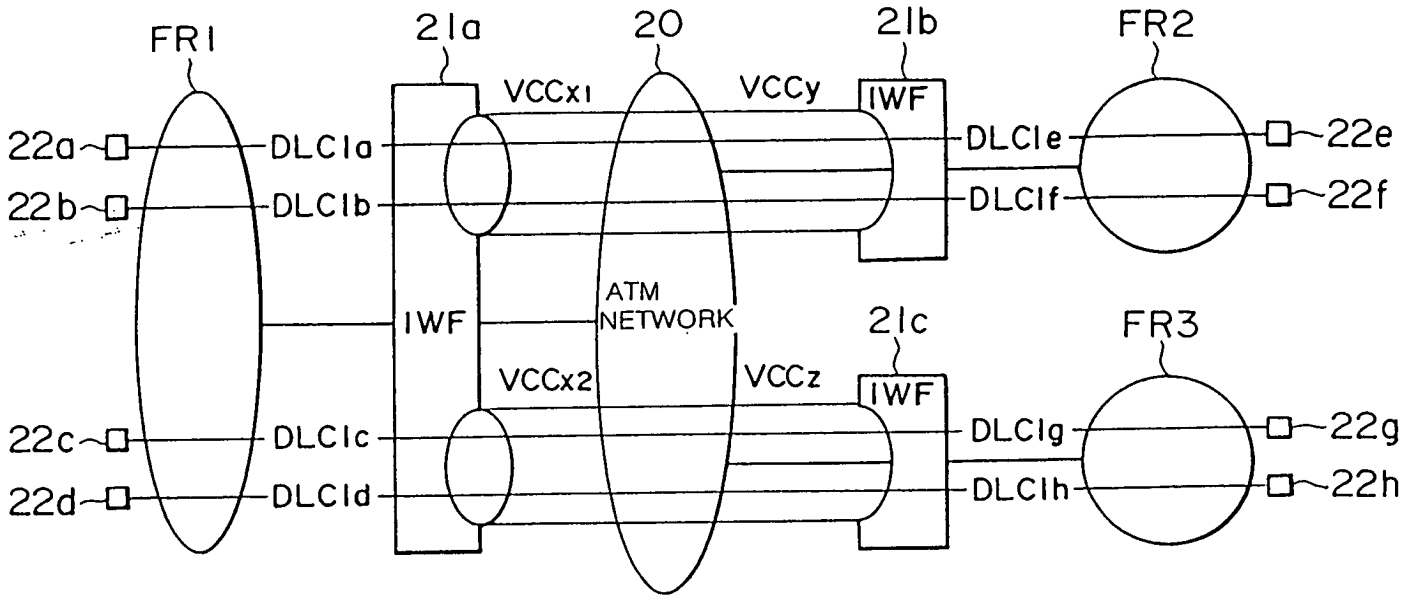

FR1
21a
20
21b
FR2
VCCx1
VCCy
IWF
22a
DLC1a
DLC1e
22e
22b
DLC1b
DLC1f
22f
ATM
NETWORK
IWF
21c
FR3
VCCx2
VCCz
IWF
22c
DLC1c
DLC1g
22g
22d
DLC1d
DLC1h
22h

FIG. 3(a)

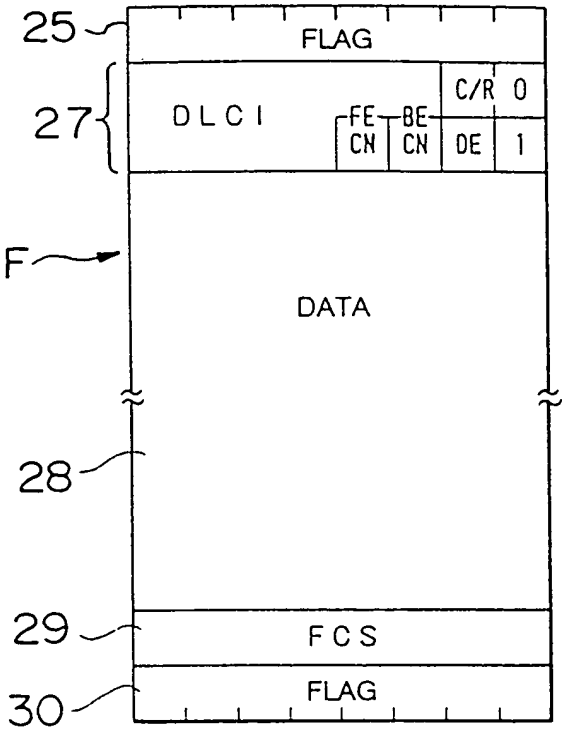
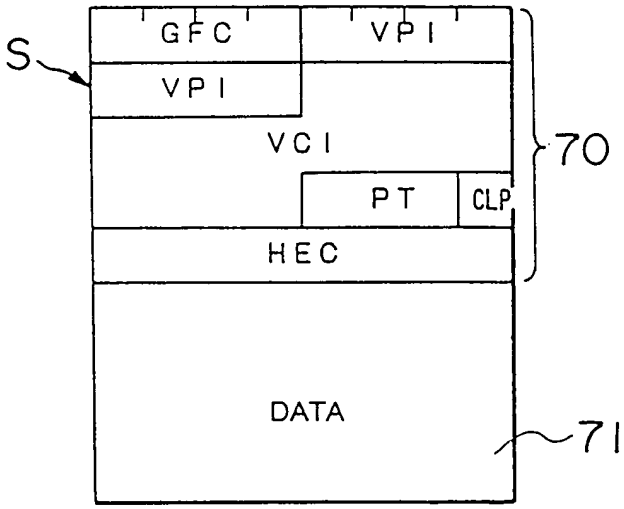

25
FLAG
27
DLCI
FECN
BECN
C/R
0
DE
1
F
DATA
28
29
FCS
30
FLAG

FIG. 3(b)


S
GFC
VPI
VPI
VCI
PT
CLP
70
HEC
DATA
71

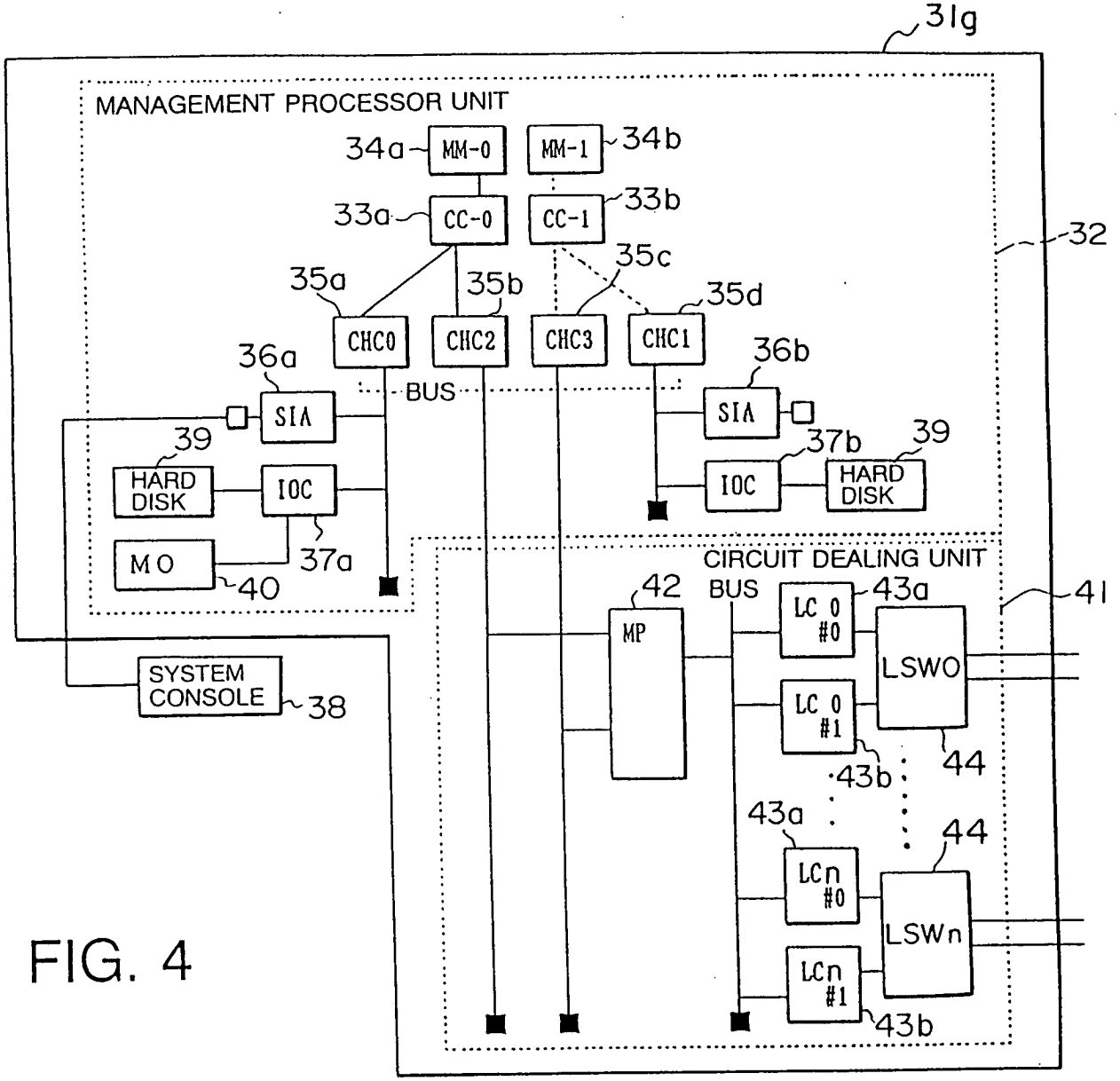

31g
MANAGEMENT PROCESSOR UNIT
34a
MM-0
MM-1
34b
33a
CC-0
CC-1
33b
32
35a
35b
35c
35d
CHC0
CHC2
CHC3
CHC1
36a
36b
BUS
SIA
SIA
39
37b
39
HARD DISK
IOC
IOC
HARD DISK
MO
37a
40
CIRCUIT DEALING UNIT
BUS
42
43a
41
MP
LC 0 #0
LSWO
LC 0 #1
44
43b
43a
44
LCn #0
LSWn
LCn #1
43b
SYSTEM CONSOLE
38

FIG. 4

FIG. 5

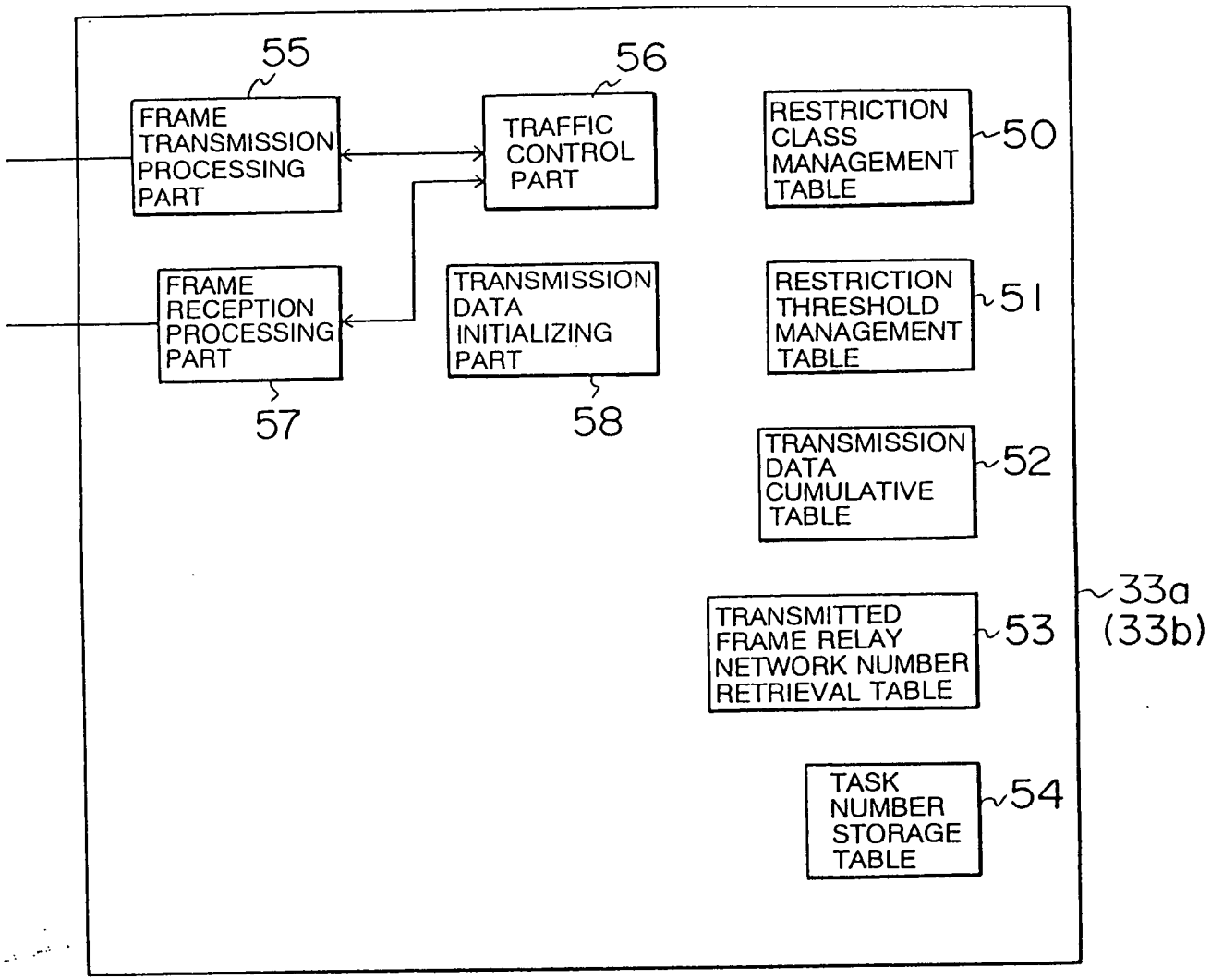

55
56
FRAME TRANSMISSION PROCESSING PART
TRAFFIC CONTROL PART
RESTRICTION CLASS MANAGEMENT TABLE
50
FRAME RECEPTION PROCESSING PART
TRANSMISSION DATA INITIALIZING PART
RESTRICTION THRESHOLD MANAGEMENT TABLE
51
57
58
TRANSMISSION DATA CUMULATIVE TABLE
52
33a
(33b)
TRANSMITTED FRAME RELAY NETWORK NUMBER RETRIEVAL TABLE
53
TASK NUMBER STORAGE TABLE
54

FIG. 6

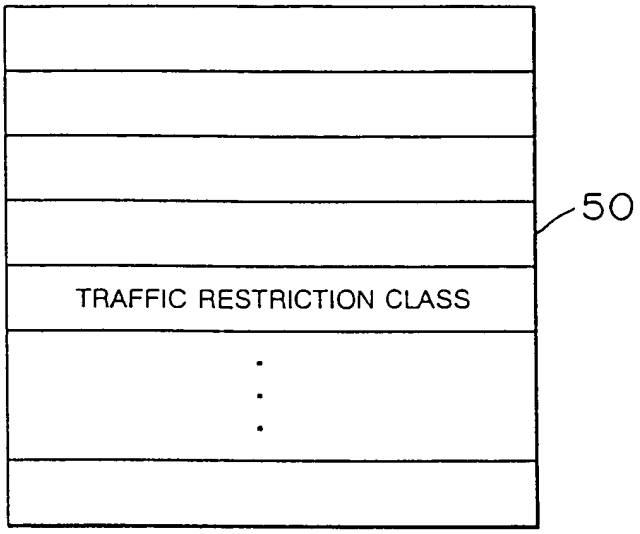

TRAFFIC RESTRICTION CLASS
50

FIG. 7

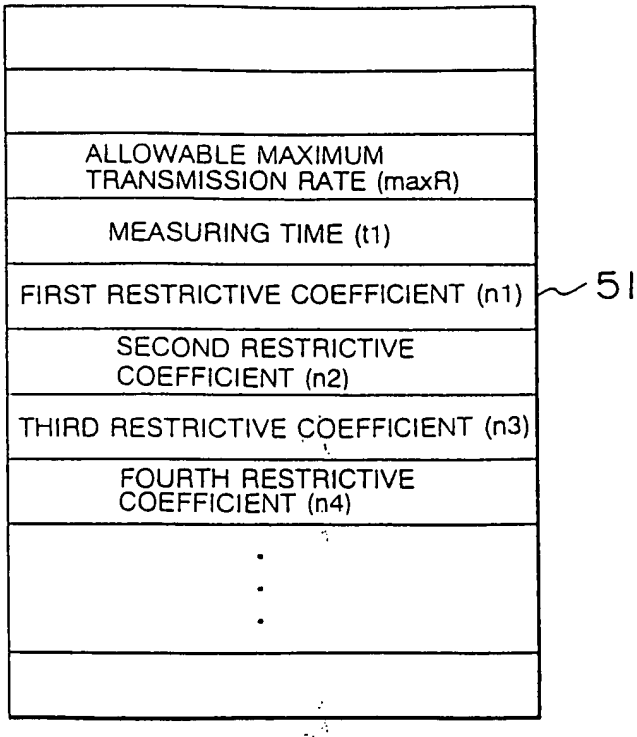

ALLOWABLE MAXIMUM TRANSMISSION RATE (maxR)
MEASURING TIME (t1)
FIRST RESTRICTIVE COEFFICIENT (n1)
SECOND RESTRICTIVE COEFFICIENT (n2)
THIRD RESTRICTIVE COEFFICIENT (n3)
FOURTH RESTRICTIVE COEFFICIENT (n4)
51

FIG. 8

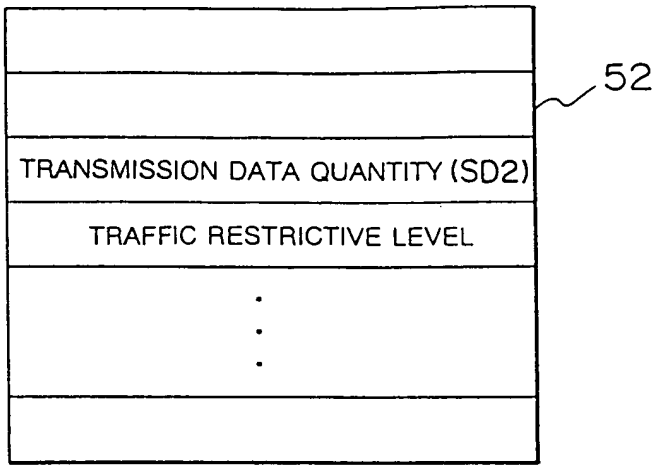

TRANSMISSION DATA QUANTITY (SD2)
TRAFFIC RESTRICTIVE LEVEL
52

FIG. 9

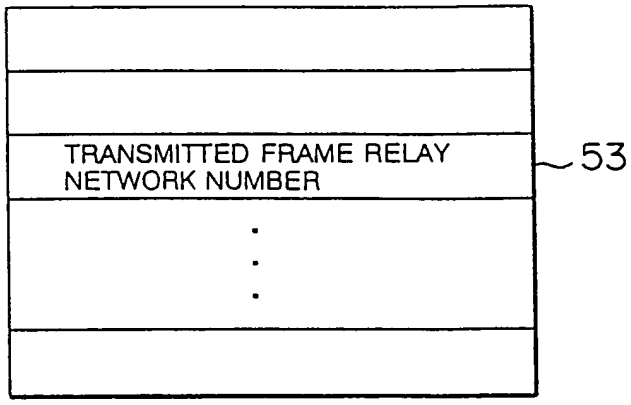
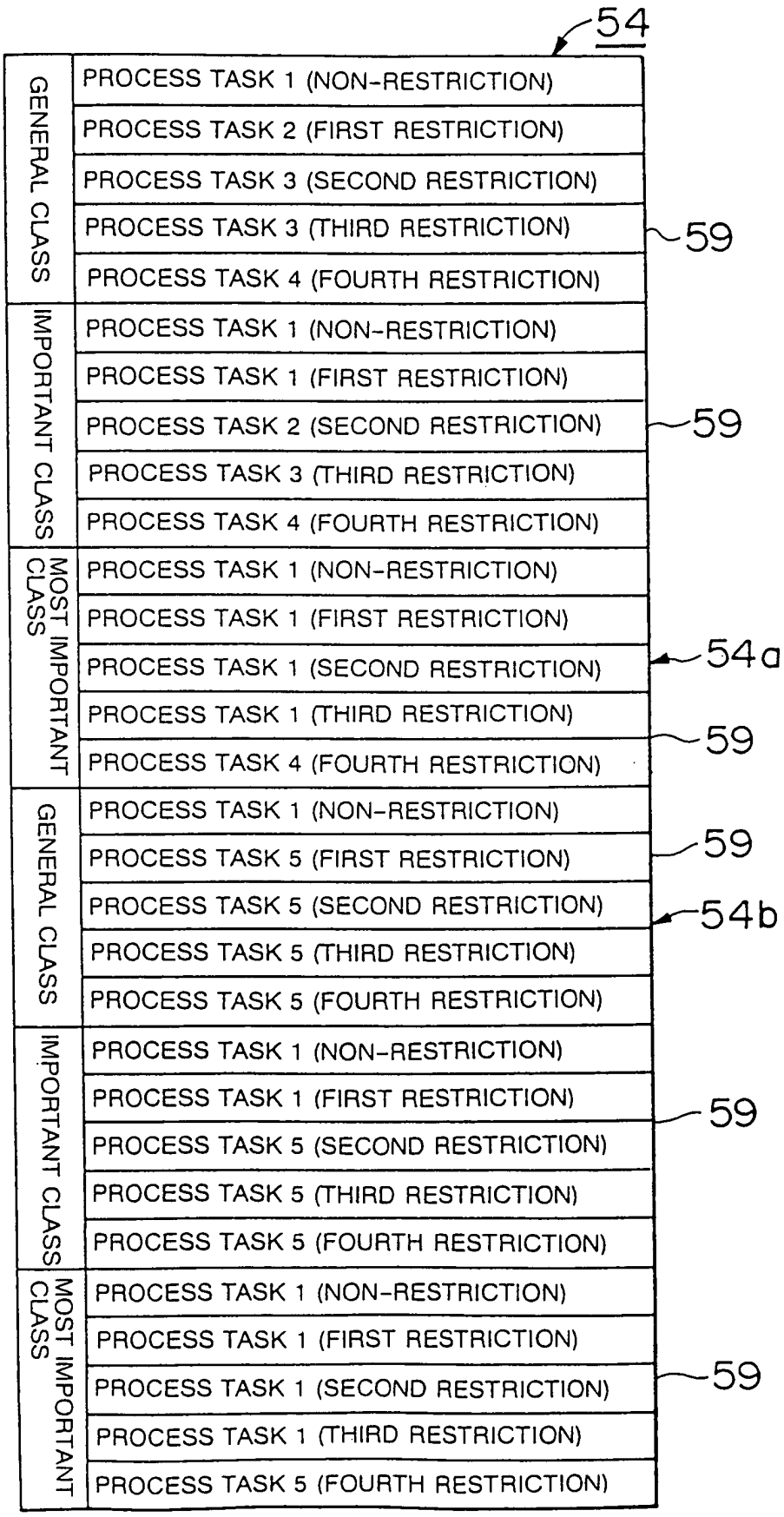
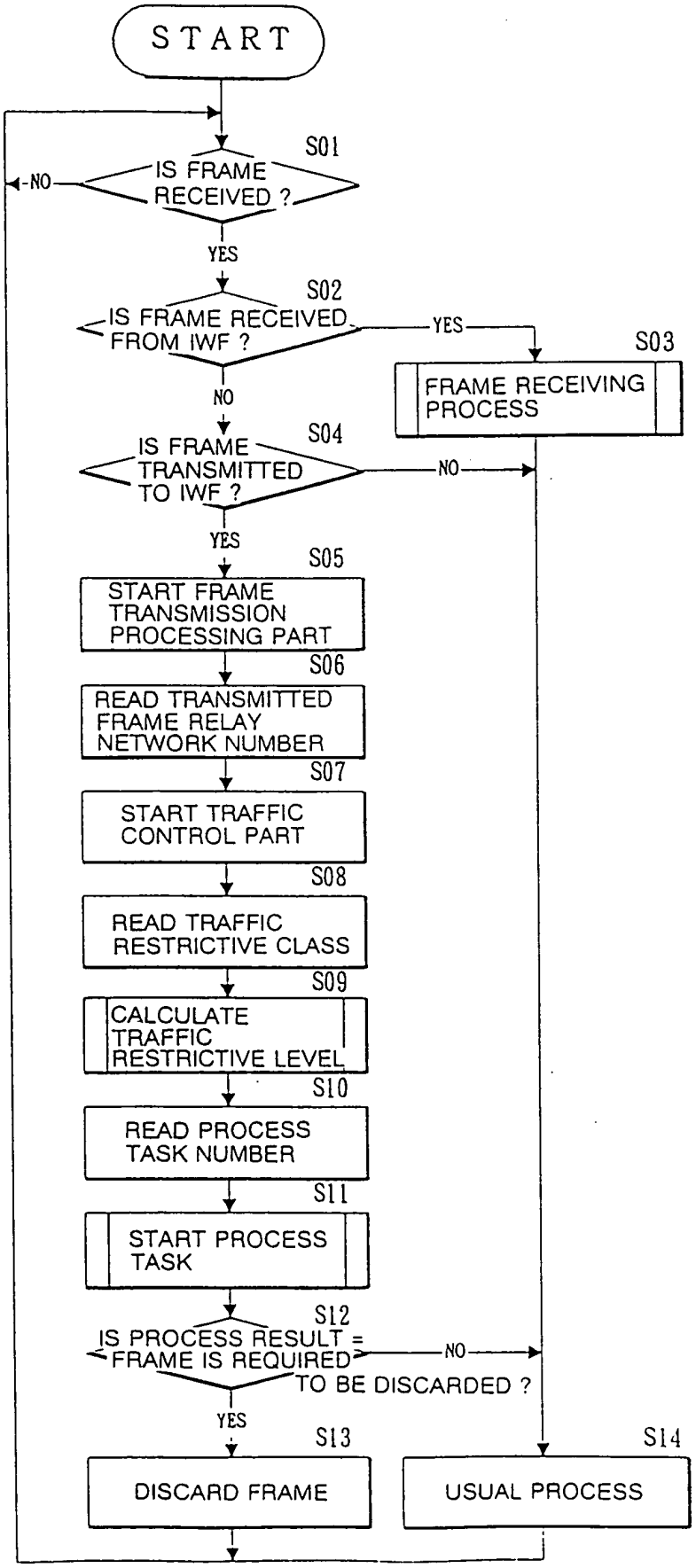

TRANSMITTED FRAME RELAY NETWORK NUMBER
53

FIG. 10



0004704 "0704648

FIG. 11


START
S01
IS FRAME RECEIVED ?
NO
YES
S02
IS FRAME RECEIVED FROM IWF ?
YES
S03
FRAME RECEIVING PROCESS
NO
S04
IS FRAME TRANSMITTED TO IWF ?
NO
YES
S05
START FRAME TRANSMISSION PROCESSING PART
S06
READ TRANSMITTED FRAME RELAY NETWORK NUMBER
S07
START TRAFFIC CONTROL PART
S08
READ TRAFFIC RESTRICTIVE CLASS
S09
CALCULATE TRAFFIC RESTRICTIVE LEVEL
S10
READ PROCESS TASK NUMBER
S11
START PROCESS TASK
S12
IS PROCESS RESULT = FRAME IS REQUIRED TO BE DISCARDED ?
NO
YES
S13
DISCARD FRAME
S14
USUAL PROCESS

0001-0074-050

FIG. 12

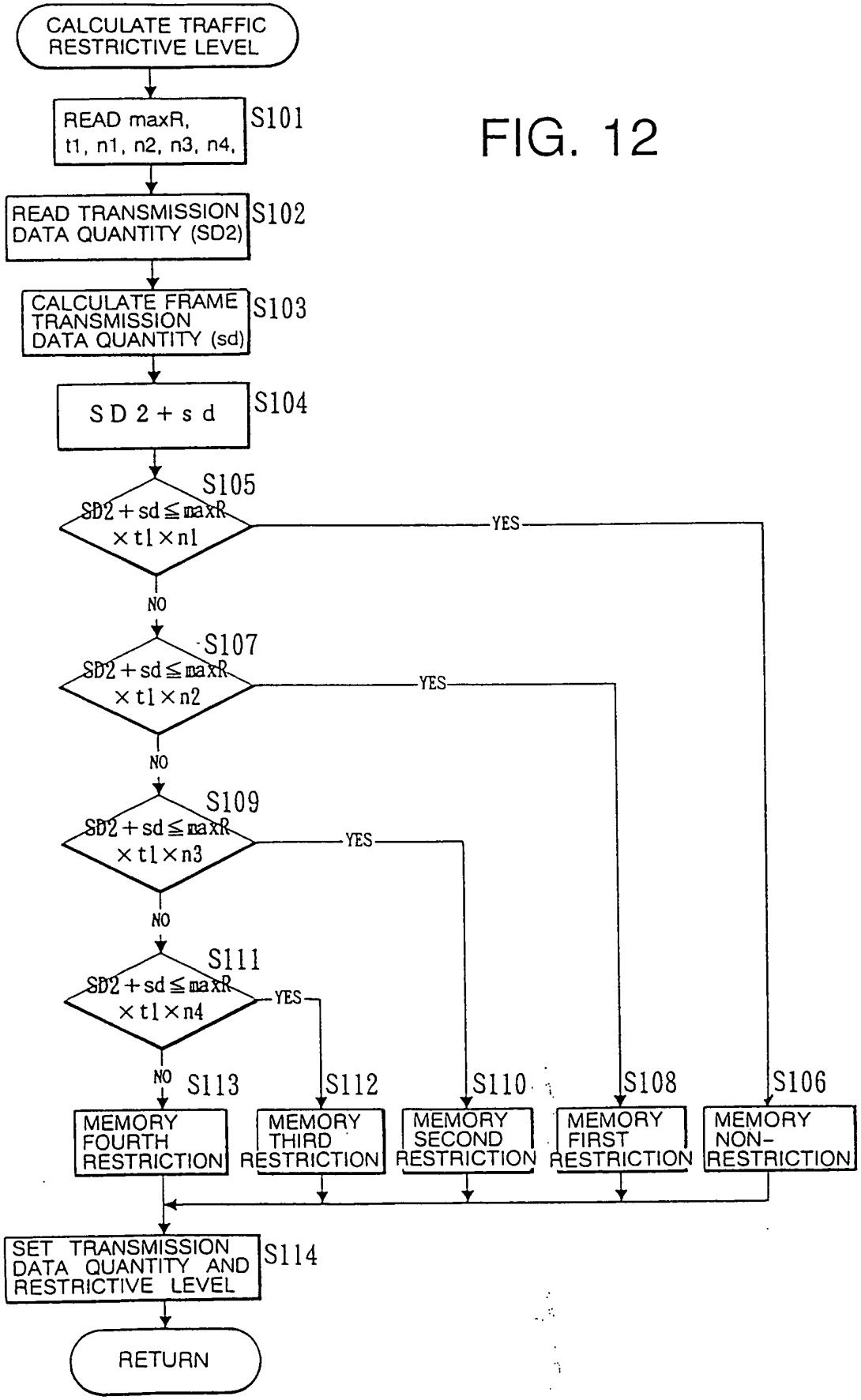


FIG. 13

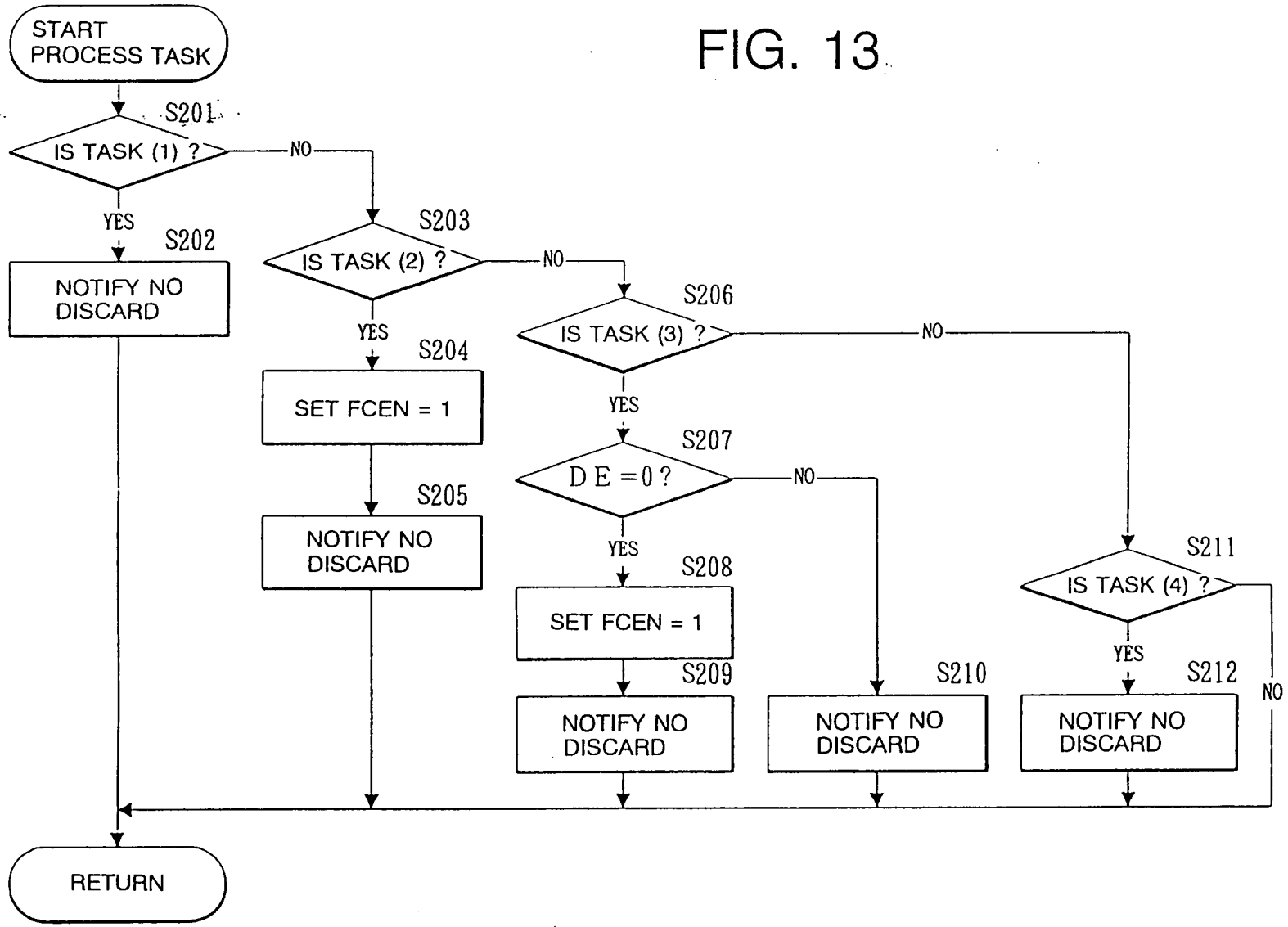

START PROCESS TASK
S201
IS TASK (1) ?
NO
YES
S202
NOTIFY NO DISCARD
S203
IS TASK (2) ?
NO
YES
S204
SET FCEN = 1
S205
NOTIFY NO DISCARD
S206
IS TASK (3) ?
NO
YES
S207
D E = 0 ?
NO
YES
S208
SET FCEN = 1
S209
NOTIFY NO DISCARD
S210
NOTIFY NO DISCARD
S211
IS TASK (4) ?
YES
NO
S212
NOTIFY NO DISCARD
RETURN

FIG. 14

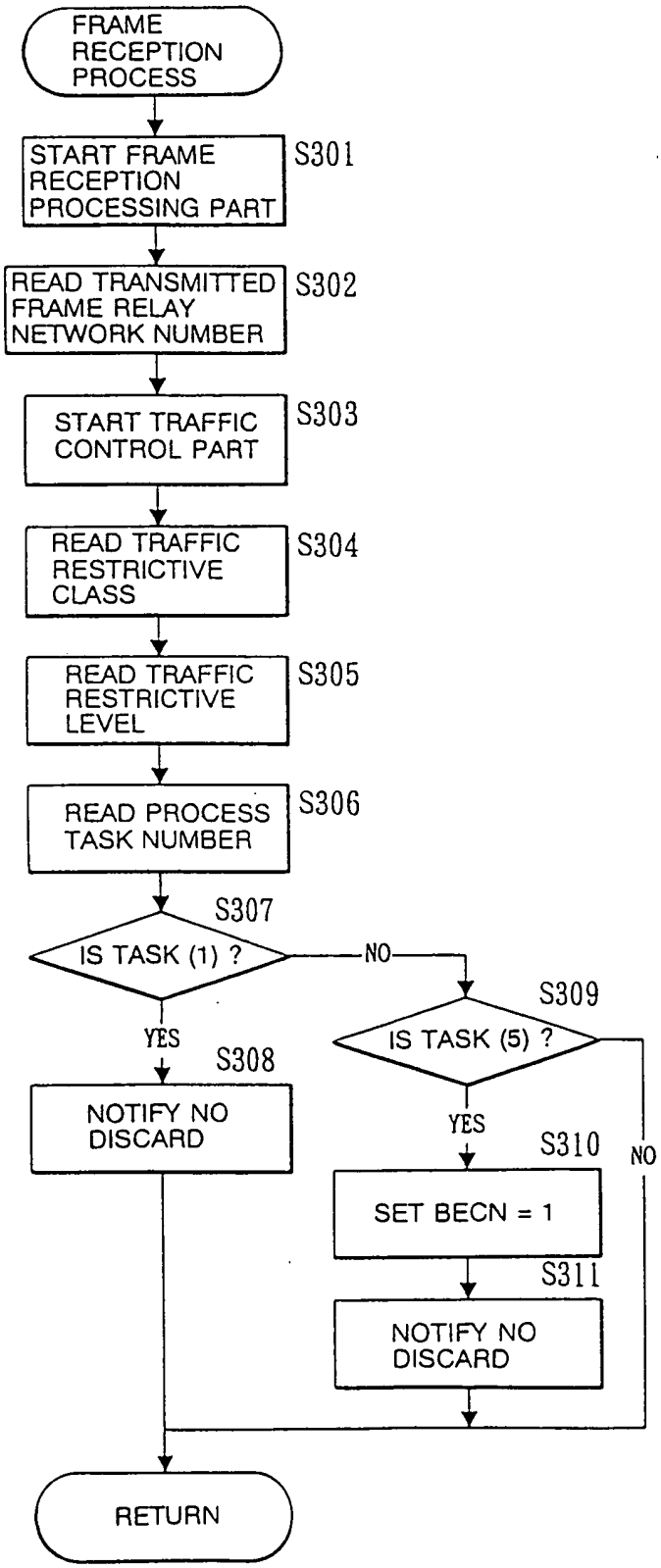

FRAME RECEPTION PROCESS
START FRAME RECEPTION PROCESSING PART
S301
READ TRANSMITTED FRAME RELAY NETWORK NUMBER
S302
START TRAFFIC CONTROL PART
S303
READ TRAFFIC RESTRICTIVE CLASS
S304
READ TRAFFIC RESTRICTIVE LEVEL
S305
READ PROCESS TASK NUMBER
S306
S307
IS TASK (1) ?
NO
YES
S308
NOTIFY NO DISCARD
S309
IS TASK (5) ?
YES
NO
S310
SET BECN = 1
S311
NOTIFY NO DISCARD
RETURN

FIG. 15

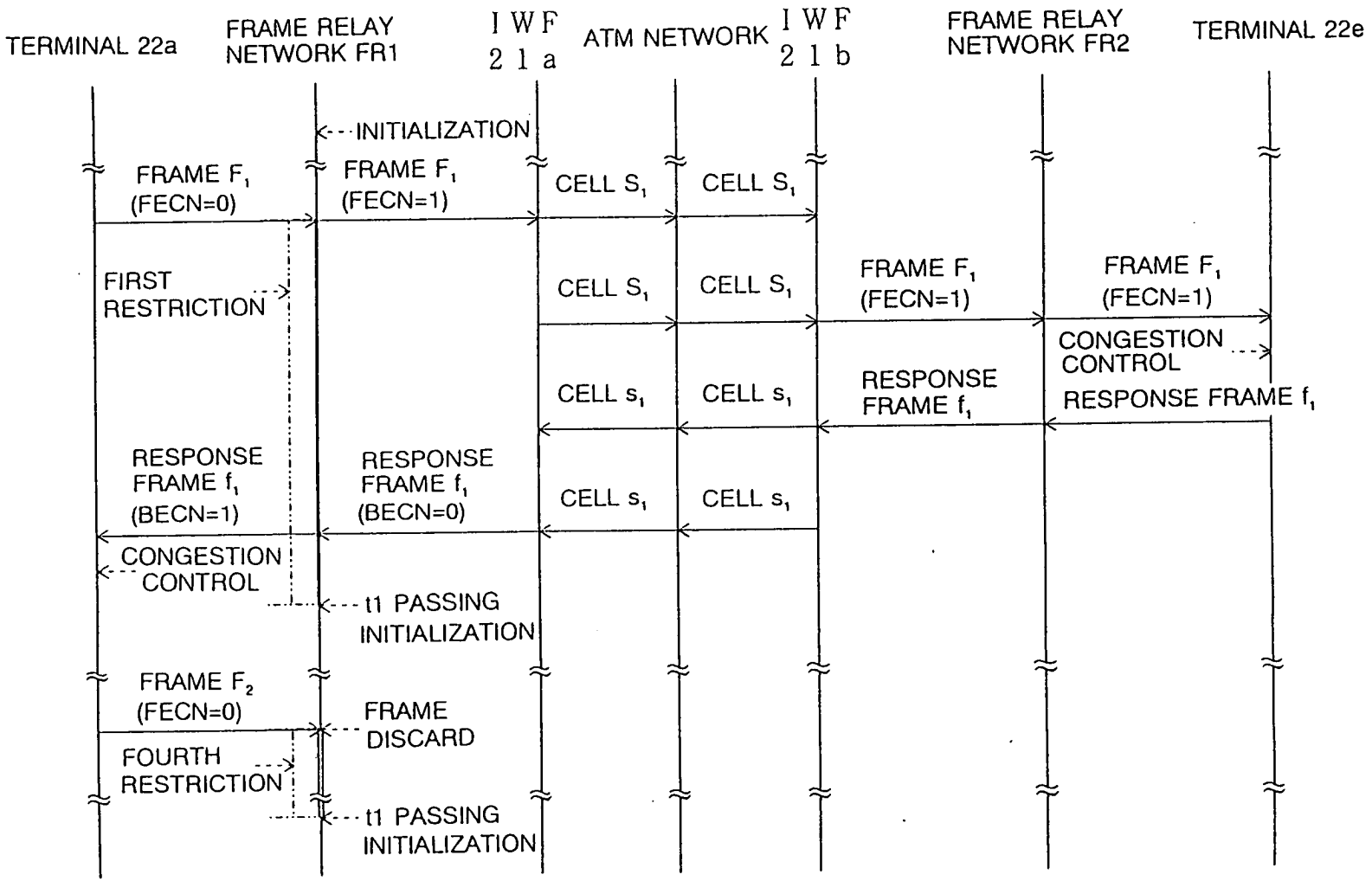

TERMINAL 22a
FRAME RELAY NETWORK FR1
I W F 2 1 a
ATM NETWORK
I W F 2 1 b
FRAME RELAY NETWORK FR2
TERMINAL 22e
INITIALIZATION
FRAME F1 (FECN=0)
FRAME F1 (FECN=1)
CELL S1
CELL S1
FIRST RESTRICTION
CELL S1
CELL S1
FRAME F1 (FECN=1)
FRAME F1 (FECN=1)
CONGESTION CONTROL
CELL s1
CELL s1
RESPONSE FRAME f1
RESPONSE FRAME f1
RESPONSE FRAME f1 (BECN=1)
RESPONSE FRAME f1 (BECN=0)
CELL s1
CELL s1
CONGESTION CONTROL
t1 PASSING INITIALIZATION
FRAME F2 (FECN=0)
FRAME DISCARD
FOURTH RESTRICTION
t1 PASSING INITIALIZATION

FIG. 16

PRIOR ART

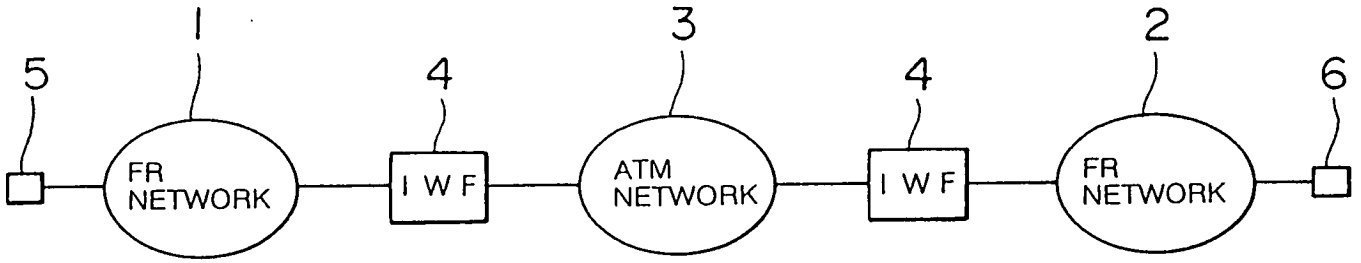


FIG. 17

RESTRICTIVE LEVEL \ TRAFFIC RESTRICTIVE CLASS		GENERAL CLASS	IMPORTANT CLASS	MOST IMPORTANT CLASS
NON-RESTRICTION	$SD \leqq maxRX\,t\,l \times n1$	NO RESTRICTION	NO RESTRICTION	NO RESTRICTION
FIRST RESTRICTION	$maxRX\,t\,l \times n1 < SD \leqq maxRX\,t\,l \times n2$	TRANSMITTED FRAME : FECN=1 RECEIVED FRAME : BECN=1		
SECOND RESTRICTION	$maxRX\,t\,l \times n2 < SD \leqq maxRX\,t\,l \times n3$	TRANSMITTED FRAME DE=0:FECN=1 DE=1:DISCARD RECEIVED FRAME : BECN=1	TRANSMITTED FRAME : FECN=1 RECEIVED FRAME : BECN=1	
THIRD RESTRICTION	$maxRX\,t\,l \times n3 < SD \leqq maxRX\,t\,l \times n4$	TRANSMITTED FRAME DE=0:FECN=1 DE=1:DISCARD RECEIVED FRAME : BECN=1	TRANSMITTED FRAME DE=0:FECN=1 DE=1:DISCARD RECEIVED FRAME : BECN=1	
FOURTH RESTRICTION	$maxRX\,t\,l \times n4 < SD$	TRANSMITTED FRAME : DISCARD RECEIVED FRAME : BECN=1	TRANSMITTED FRAME : DISCARD RECEIVED FRAME : BECN=1	TRANSMITTED FRAME : DISCARD RECEIVED FRAME : BECN=1

* SD: TRANSMISSION DATA QUANTITY,

** $0 < n1 < n2 < n3 < n4 \leqq 1$

*** "DE=0:FECN=1" INDICATES THAT FECN=1 IS SET FOR FRAME OF DE=0

**** "DE=1:DISCARD" INDICATES THAT FRAME OF DE=1 IS DISCARDED